24. (New) A method for supplying a contrast medium to a patient's vascular system comprising:

(a) providing a flexible bag filled with contrast medium at essentially atmospheric pressure;

(b) operatively connecting said flexible bag to the patient's vascular system via a gas transfer system;

(c) purging said gas transfer system of air; and

(d) delivering said contrast medium from said flexible bag through said gas transfer system to the patient's vascular system.

25. (New) The method of Claim 24, wherein said gas transfer system comprises:

a dual check valve adapted to be connected to a lower pressure source of contrast medium, said dual check valve having a first inlet port, a first outlet port and a first inlet-outlet port,

said dual check valve containing a first one-way valve at said first inlet port automatically responsive to the relatively low pressure at said first inlet-outlet port to permit downstream fluid flow and to prevent upstream fluid flow,

said dual check valve containing a second one-way valve at said first outlet port automatically responsive to the relatively high pressure at said first inlet-outlet port to permit downstream fluid flow and to prevent upstream fluid flow,

said first inlet-outlet port in communication with said first and second one-way valves and adapted to be connected to a pump,

a connecting tubular member having an upstream and a downstream end, said upstream end in communication with said first outlet port of said dual check valve,

suction at said first inlet-outlet port by the pump causing flow of medium from whatever source is coupled to said first inlet port through said first one-way valve into the pump, said second one-way valve preventing fluid flow upstream from said connecting tubular member into the pump, and

positive pressure at said first inlet-outlet port from the pump causing fluid flow through said second one-way valve and said first outlet port into said tubular member, said first one-way valve preventing upstream fluid flow to the source,

wherein said gas transfer system delivers contrast medium at low pressure to a catheter for delivery to the patient's vascular system.

26. (New) The method of Claim 25, wherein said gas transfer system further comprises a first stopcock upstream of said first inlet port of said dual check valve to turn flow from the source on and off.

27. (New) The method of Claim 26, wherein said gas transfer system further comprises a second stopcock on said downstream end of said tubular member to turn flow into the catheter on and off.

28. (New) The method of Claim 25, wherein said gas transfer system further comprises a stopcock on said downstream end of said tubular member to turn flow into the catheter on and off.

29. (New) The method of Claim 25, wherein said gas transfer system further comprises an in-line check valve connected to said downstream end of said tubular member, wherein said in-line check valve has a second inlet port in which said tubular

member is connected, a second inlet-outlet port adapted to be connected to an ancillary pump, and a second outlet port connected to a first stopcock which is connected to the catheter.

30. (New) The method of Claim 29, wherein said gas transfer system further comprises a second stopcock upstream of said first inlet port of said dual check valve to turn flow from the source on and off.

31. (New) The method of Claim 30, wherein said gas transfer system further comprises a third stopcock disposed between the ancillary pump and the second inlet-outlet port.

32. (New) The method of Claim 31, wherein step (c) comprises operating the pump to flush air out of said tubular member and subsequently operating said first stopcock to allow blood flow from the patient through the catheter and out of a port of said first stopcock.

33. (New) The method of Claim 32, further comprising a step of replacing blood in the catheter with said contrast medium prior to step (d).

34. (New) The method of Claim 33, wherein the step of replacing blood in the catheter comprises operating the pump to draw an aliquot of said contrast medium from said flexible bag and subsequently pushing said aliquot of said contrast medium into the catheter.

35. (New) The method of Claim 24, wherein said gas transfer system comprises:

a first dual check valve adapted to be connected to a lower pressure source of said contrast medium, said first dual check valve having a first inlet port, a first outlet port and a first inlet-outlet port,

said first dual check valve containing a first one-way valve at said first inlet port automatically responsive to the relatively low pressure at said first inlet-outlet port to permit downstream fluid flow and to prevent upstream fluid flow,

said first dual check valve containing a second one-way valve at said first outlet port automatically responsive to the relatively high pressure at said first inlet-outlet port to permit downstream fluid flow and to prevent upstream fluid flow,

said first inlet-outlet port in communication with said first and second one-way valves and adapted to be connected to a pump,

a connecting tubular member having an upstream and a downstream end, said upstream end in communication with said first outlet port of said first dual check valve,

suction at said first inlet-outlet port by the pump causing flow of medium from whatever source is coupled to said first inlet port through said first one-way valve into the pump, said second one-way valve preventing fluid flow upstream from said connecting tubular member into the pump,

positive pressure at said first inlet-outlet port from the pump causing fluid flow through said second one-way valve and said first outlet port into said tubular member, said first one-way valve preventing upstream fluid flow to the source, and

a third one-way valve in communication with said downstream end of said tubular member to permit downstream fluid flow from said tubular member and to prevent upstream fluid flow in said tubular member;

wherein said gas transfer system delivers contrast medium at low pressure to a catheter for delivery to the patient's vascular system.

36. (New) The method of Claim 35, wherein said gas transfer system further comprises a first stopcock upstream of said first inlet port of said first dual check valve to turn flow from the source on and off.

37. (New) The method of Claim 36, wherein said gas transfer system further comprises a second stopcock downstream of said third one-way valve to turn flow into the catheter on and off.

38. (New) The method of Claim 35, wherein said gas transfer system further comprises:

a second dual check valve downstream of said downstream end of said tubular member and incorporating said third one-way valve,

said second dual check valve having a second inlet-outlet port adapted to be connected to an ancillary pump, and

said second dual check valve having a fourth one-way valve in communication with said second inlet-outlet port to permit downstream fluid flow from the ancillary pump, said third one-way valve preventing upstream fluid flow from the ancillary pump.

39. (New) The method of Claim 38, wherein said gas transfer system further comprises a first stopcock upstream of said first inlet port of said first dual check valve to turn flow from the source on and off.

40. (New) The method of Claim 39, wherein said gas transfer system further comprises a second stopcock downstream of said second dual check valve to turn flow into the catheter on and off.

41. (New) The method of Claim 40, wherein step (c) comprises operating the pump to flush air out of said tubular member and subsequently operating said second stopcock to allow blood flow from the patient through the catheter and out of a port of said second stopcock.

42. (New) The method of Claim 41, further comprising a step of replacing blood in the catheter with said contrast medium prior to step (d).

43. (New) The method of Claim 42, wherein the step of replacing blood in the catheter comprises operating the pump to draw an aliquot of said contrast medium from said flexible bag and subsequently pushing said aliquot of said contrast medium into the catheter.

44. (New) The method of Claim 24, wherein step (a) comprises:

(1) filling said flexible bag with said contrast medium;

(2) removing said contrast medium from said flexible bag;

(3) repeating steps (1) and (2) multiple times; and

(4) filling said flexible bag with said contrast medium at essentially atmospheric pressure.